## Amendments to the Specification

### The Paragraph beginning at Page 5, lines 17-26, is to be amended as follows:

Referring now to Figure 2, there is depicted a block diagram of removable inkjet printer cartridge 6. Cartridge 6 includes ink refill port 8 and an ink delivery assembly 10 for storing and delivering ink to a micro-electromechanical pagewidth print head chip 52. Printhead chip 52 receives power and data signals from cradle 4 (see Fig. 1) via power and data interface 58. A rotor element 60, which is mechanically driven by cradle 4 has three faces which respectively serve to: blot printhead chip 52 subsequent to ink ejection; seal the printhead when it is not in use; and act as a platen during printing. Accordingly, rotor element 60 acts as an auxiliary assembly to the printhead in that it assists in maintaining proper printhead functioning. Cartridge 6 also includes an authentication device in the form of quality assurance chip 57 which contains various manufacturer codes that are read by electronic circuitry of controller board 82 of cradle [[4 ]]during use. The manufacturer codes are read to verify the authenticity of cartridge 6.

### The Paragraphs beginning at Page 7, lines 6-16, are to be amended as follows:

The purpose of the pressurized air is to prevent degradation of the printhead by keeping its nozzles free of dust and debris. The pressurized air is provided by an air compressor (item 122 of Figure ~~14~~13) incorporated into cradle 4. An air nozzle (item 124 of Figure ~~15~~13) of the compressor pierces air seal 44 upon insertion of cartridge 6 into cradle 4 and mates with air inlet port 76. An air coverplate 54 is fixed to the cartridge base molding and evenly distributes air across printhead 52 in the manner described above.

Power and data signals are provided to printhead 52 by means of busbar 56which is in turn coupled to external data and power connectors 58A and 58B. An authentication device in the form of a quality assurance (QA) chip 57 is mounted to connector 58A. Upon inserting print cartridge 6 into cradle 4 the data and power connectors 58A and 58B, and QA chip 57, mate with corresponding connectors (items 84A, 84B of Figure ~~9~~3) on cradle 4, thereby facilitating power and data communication between the cradle and the cartridge. QA chip 57 is tested in use by a portion of controller board 82 configured to act as a suitable verification circuit.

### The Paragraph beginning at Page 8, lines 20-21, is to be amended as follows:

The ink jet printhead chip ~~12~~ 52 (see Fig. 6) includes a silicon wafer substrate 801. 0.35 Micron 1 P4M 12 volt CMOS microprocessing circuitry is positioned on the silicon wafer substrate 8015.

### The Paragraphs beginning at Page 9, lines 4-15, are to be amended as follows:

The nozzle arrangement 801 includes a nozzle chamber 8029 defined by an annular nozzle wall 8033, which terminates at an upper end in a nozzle roof ~~8034~~ 805 and a radially inner nozzle rim 804 that is circular in plan. The ink inlet channel 8014 is in fluid communication with the nozzle chamber 8029. At a lower end of the nozzle wall, there is disposed a moving rim 8010, that includes a moving seal lip 8040. An encircling wall 8038 surrounds the movable nozzle, and includes a stationary seal lip 8039 that, when the nozzle is at rest as shown in Figure 10, is adjacent the moving rim 8010. A fluidic seal 8011 is formed due to the surface

tension of ink trapped between the stationary seal lip 8039 and the moving seal lip 8040. This prevents leakage of ink from the chamber whilst providing a low resistance coupling between the encircling wall 8038 and the nozzle wall 8033.

As best shown in Figure 17, a plurality of radially extending recesses 8035 is defined in the roof ~~8034~~ 805 about the nozzle rim 804. The recesses 8035 serve to contain radial ink flow as a result of ink escaping past the nozzle rim 804.

## The Paragraph beginning at Page 10, lines 18-22, is to be amended as follows:

The downward movement (and slight rotation) of the lever arm 8018 is amplified by the distance of the nozzle wall 8033 from the passive beams 806. The downward movement of the nozzle walls and roof causes a pressure increase within the chamber 8029, causing the meniscus to bulge as shown in Figure 11. It will be noted that the surface tension of the ink means the fluid seal 8011 is stretched by this motion without allowing ink to leak out.

## The Paragraph beginning at Page 11, lines 3-10, is to be amended as follows:

As best shown in Figure 13, the nozzle arrangement also incorporates a test mechanism that can be used both post-manufacture and periodically after the printhead is installed. The test mechanism includes a pair of contacts 8020 that are connected to test circuitry (not shown). A bridging contact 8019 is provided on a finger 8080~~43~~ that extends from the lever arm 8018. Because the bridging contact 8019 is on the opposite side of the passive beams 806, actuation of the nozzle causes the priding contact to move upwardly, into contact with the contacts 8020. Test circuitry can be used to confirm that actuation causes this closing of the circuit formed by the contacts 8019 and 8020. If the circuit closed appropriately, it can generally be assumed that the nozzle is operative.

## The Paragraphs beginning at Page 11, lines 13-30, are to be amended as follows:

Figure 20 is a functional block diagram of printer cradle 4. The printer cradle is built around a controller board 82 that includes one or more custom Small Office Home Office Printer Engine Chips (SoPEC) whose architecture will be described in detail shortly. Controller board ~~10~~ 82 is coupled to a USB port 130 for connection to an external computational device such as a personal computer or digital camera containing digital files for printing. Controller board ~~10~~ 82 also monitors:

a paper sensor 192, which detects the presence of print media;

a printer cartridge chip interface 84, which in use couples to printer cartridge QA chip 57 (see Fig. 6);

an ink refill cartridge QA chip contact 132, which in use couples to an ink refill cartridge QA chip (visible as item 176 in Figure 37); and

rotor element angle sensor ~~156~~149, which detects the orientation of rotor element 60 (see Fig.6).

In use the controller board processes the data received from USB port 130 and from the various sensors described above and in response drives a motor 110, tricolor indicator LED 135 and, via interface 84, printhead chip 52 (see Fig.6). As will be explained in more detail later, motor 110 is mechanically coupled to

drive a number of mechanisms that provide auxiliary services to print cartridge 6 (see Fig.6). The driven mechanisms include:

a rotor element drive assembly 145, for operating rotor element 60 (see Fig.6);

a print media transport assembly 93, which passes print media across printhead chip 52 during printing; and

an air compressor 122 which provides compressed air to keep printhead chip 52 (see Fig.6) clear of debris.

## The Paragraph beginning at Page 12, lines 22-26, is to be amended as follows:

With reference to Figure 25, drive shaft 127 of motor 110 terminates in a worm gear 129 that meshes with a cog 125B that is, in turn, fixed to drive roller 96. Referring again to Figure 26, the drive roller is supported at either end by bearing mount assemblies 100A and 100B, which are in turn fixed into slots 101A and 101B of cradle mounting 80 (see also Fig. 30). Similarly, rotor element translation roller 94 and pinch roller 98 are also supported by bearing mount assemblies 100A and 100B.

## The Paragraphs beginning at Page 12, lines 27-30, through to Page 13, lines 1-14, are to be amended as follows:

Referring now to Figure 30, opposite the motor end of drive roller 96 there is located a flipper gear assembly 140. The flipper gear assembly consists of a housing 144 which holds an inner gear 142 and an outer gear 143 that mesh with each other. The inner gear is fixed and coaxial with drive roller 96 whereas housing 144 is free to rotate about drive roller 96. In use the housing rotates with drive roller 96 taking with it outer gear 143 until it either abuts a stopper located on the cradle base molding 90 or outer gear 143 meshes with rotor element drive cog 146. The direction of rotation of drive roller 96 is dependent on the sense of the driving current applied to motor 110 by control board 82 (see Fig. 29). The meshing of outer gear 143 with rotor element drive cog 146 forms rotor element drive assembly 145 comprising drive roller 96, inner gear 142, outer gear 143 and rotor element drive cog 146. Consequently, in this configuration power can be transmitted from drive roller 96 to rotor element drive roller 94.

With reference to Figures 30 and 31, the opposite ends of rotor element drive roller 94 terminate in cams 148A and 148B which are located in corresponding cam followers 150A and 150B. Cam followers 150A and 150B are ring shaped and pivotally secured at one side by pivot pins 152A and 152B respectively. Hinged jaws 154A and 154B are provided for clutching the rotor element slider blocks (items 66A, 66B of Figure 6) of the printer cartridge. The jaws are each pivotally connected to cam followers 150A and 150B opposite pins 152A and 152B respectively. Upon rotor element drive roller 94 being rotated, cams 148A and 148B abut the inner wall of cam followers 150A and 150B thereby causing the cam followers to rise taking with them jaws 154A and 154B respectively.

**The Paragraphs beginning at Page 13, lines 24-30, through to Page 14, lines 1-6, are to be amended as follows:**

A metal backplane 92 is secured to the rear of cradle molding 80 as may be best seen in side view in Figure 25 and in cross section in Figure 27. Mounted to backplane 92 is a control board 82 loaded with various electronic circuitry. The control board is covered by a metal radio frequency interference (RFI) shield 102. Control board 82 is electrically coupled to cradle connectors 84A and 84B via a flex PCB connector 106 and also to an external data and power connection point in the form of USB port connector 130. USB connector 130 enables connection to an external personal computer or other computational device. Cradle connectors 84A, 84B are supported in slots formed at either end of cradle molding 80 and are arranged so that upon printer cartridge 6 being fully inserted into recess 89 of the cradle molding, cradle connectors 84A and 84B make electrical contact with cartridge connectors 58A and 58B <u>(see Fig. 6)</u>.

Controller board 82 is connected by various cable looms and flexible PCB 106 to QA chip contact 132. The QA chip contact is located in a recess 134 formed in cradle molding 80 and is situated so that during ink refilling it makes contact with a QA chip 176 located in <u>an</u> ink refill cartridge ~~162 as~~<u>that</u> will be described shortly.

**The Paragraph beginning at Page 24, lines 28-30, through to Page 2, lines 1-7, is to be amended as follows:**

Referring now to Figure 40, the first step of the ink refilling procedure is initiated by refill sensor 35 indicating to controller board 82 that there is a deficiency of printing fluid in storage reservoirs 28, 30, 32, 34. In response to the signal from ~~refill sensor 35~~<u>the ink cartridge QA chip that the ink is nearly depleted,</u> controller board 82 activates indicator LED ~~135~~<u>138 to inform the user that another refill is necessary</u>. Alternatively, the detection of whether there is a deficiency of printing ink might instead be calculated by the electronics of the controller board. As the volume of ink per nozzle injection is known and is consistent throughout the operation of the printhead (approximately 1 picolitre) the amount of ink delivered by the printhead can be calculated as well as the consumption of each color or type of ink. In this regard controller board 82 is able to monitor the consumption of each printing fluid and once this level has reached a predetermined level, the tricolor indicator LED can be asserted to indicate to a user that there is a need to replenish the printing fluids.